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# THE SCHOOL REVIEW

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## THE STUDY OF EXPERIMENTAL PEDAGOGY IN GERMANY

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There is at present a great fermentation going on in the German schools; each man's hand is against his neighbor's. But it has not long been so. Until recently there were in Germany only two ruling pedagogical tendencies. In the *Gymnasien* the humanistic traditions were always active. The common schools acknowledged Herbart's psychology as authority, and imparted instruction in accordance with its principles. But with the famous pronouncement of the German emperor (1900), the enchanted slumber prevailing in the affairs of the schools came to an end. New impetus and vital movement came into all school questions. Many an educational theory, which had hitherto hidden in modest, unknown corners now ventured boldly forth.

*Realistic* tendencies have become very active. They are the principles which inspire the party of the so-called "reformers." This party would like to abolish immediately the *Gymnasium* with its humanistic tendencies, and occasionally calls in question the worth of the whole instruction of the schools. Gurlitt's book "The German and His School" (*Der Deutsche und seine Schule*) gives a good picture of the aims and motives of the reformers.

But not only has the old struggle between humanistic and realistic ideals broken out again. Entirely *new pedagogical prin-*

*ciples* have come to the front, and have raised new problems and points of view which summon the higher schools as well as the lower before the tribunal of criticism. On one side, the movement for social education has arisen, which would bring the aims of the school in closer touch with life and problems of society. The champions of this line of thought are Natorp, a university professor, and Bergemann from the school system. On the other side, Berthold Otto, in his "The Course of Study in the School of the Future" (*Lehrgang der Zukunftsschule*), demands an entirely new *method* of instruction. It is to be based upon the natural interests of the scholars and on their being permitted to ask questions, whereas the method in use up to the present has laid upon the scholars only a learn-and-answer compulsion.

It is not to be wondered at that the multiformity of these principles and opinions today in Germany has brought all school questions into an unsettled state. Lively discussions are going on concerning the aim of the school, the curriculum, and the method of instruction. And in these questions a confusion of opinions has arisen which brings to mind the proverb: "Many men, many minds."

In this conflict the universities have begun to take an active part by the formation of a new department of science. They have made of *experimental pedagogy* a tool of pedagogical research and criticism which promises to become of great importance. Over against the discord in views, which in the case of men engaged in the school system has risen almost to the vehemence of party passion, experimental pedagogy sets up objective standards which give sure orientation. Here neither hasty judgments nor the blind opinions of custom are valid, but only the judicial standard of experiment and statistical science. The decision does not rest on the subjective impression of the teacher, which is here one thing and there another, but on the sober results of scientific observation.

This science of experimental pedagogy has sprung from experimental psychology. The reader must not forget what experimental psychology means. It is the latest development of the study of psychology, begun by Gustav Theodor Fechner.

when he discovered psycho-physical methods of measuring. At first it concerned itself only with the measuring of sensations. Wilhelm Wundt, George Elias Müller, and other savants made gradual progress toward the application of the experimental method of measurement and statistical enumeration to the other processes of consciousness. The ever-growing science of experimental psychology has won for itself many fine results. But it worked quietly, and was little known in pedagogical circles, being cultivated exclusively in the laboratories of universities.

Perhaps one might also say that the German instructors were negligent in acquainting themselves with this latest advance of psychology. The psychological interest as such had indeed never failed them for about three quarters of a century. Whether with Comenius and Pestalozzi the teacher avowed the principle of "perception," whether he employed Ziller's formal steps in order to call forth in his scholars effective processes of learning and appropriating, or whether he sought to bring the understanding of the pupil into action by means of developing questions, in every case he was directed to psychology—psychology of perception, of learning and mental acquisition, of understanding and comprehension. For this reason the German teachers have more and more laid it to heart to concern themselves with the current scientific psychology.

On the other side, the latter (I mean the earlier psychology), troubled itself still less about them. Its expounders discussed at the universities the division of the processes of consciousness, the phenomena of association and apperception, the questions concerning the origin of the idea of space, concerning the freedom of the will, etc.; but they discussed no questions of the psychology of teaching in particular. The teachers had to seek out painfully from abstract and learned investigation what they needed or thought they needed for their purposes; one or another of them brought together the knowledge which he had read and searched out into a generally understandable form. This became then the current coin among others of his profession, and supplied the psychological necessities of instruction.

In such a way the one-sided thoughts and the rigid termi-

nology of the Herbartian psychology were scattered broadcast through the lower and middle schools of Germany. Since Herbart's *Didactik* had quickly gained control of the teaching in the common schools, the natural psychological supplement to it seemed to be found in Herbart's psychology. The expert of course knows that Herbart arrived at his clear-sighted pedagogical method rather in spite of his psychology than because of it. But the habit of swearing by Herbart, once admitted, has grown stronger since then with the tenacious strength of long-continued tradition. The pedagogical psychology of the elementary schools has remained stationary at this point, and has, as it were, become set and rigid, although in the meantime the whole outlook of scientific psychology has changed.

This psychological standstill in the circles of elementary teachers must not be wondered at. People had simply become accustomed to see the theory of methods in the common schools supported by the Herbartian psychology. Its concepts had settled into use as familiar and convenient instruments. And that things kept on in the same old way was natural, in view of that general human weakness which makes it always harder to learn the same subject over again in a different way, and to leave the places which one has already occupied, than it is to begin a journey and to learn things that are new: *quieta non movere*. Further, scientific psychology, which in the meantime had gone forward with vigor, still remained engaged in abstract investigations. Educational problems stood as they had stood before, far beyond its horizon. And so nothing came from this direction to arouse the teachers to a fundamentally new way of thinking and learning, by bringing the questions of education in touch with the wider and freer view-points of the university.

Fortunately for themselves, the teachers of the higher branches escaped the meshes of the Herbartian psychology. This happened partly because the higher instruction fitted far less into Herbart's pedagogical method, so that they lacked just that incitement toward the use of Herbart's psychology which had worked so suggestively on the teachers of the common schools; partly, also, because the psychological movement seized the hosts

of the higher teachers much later. Accomplished in their particular sciences,<sup>1</sup> living in them and holding fast to them, they were from the beginning much less inclined to be absorbed in psychology. Indeed, one might almost say that a period marked by lack of confidence in psychology lay not very far behind them.

When at last psychological interest awoke in the circles of the higher schools, it looked naturally for its satisfaction to the university psychology of the time; that is, to a psychology which had long left Herbart behind. Scientific psychology of the time had thrown over Herbart's mathematical presuppositions as to the nature of ideas, the play of their movements, and the construction of other psychological processes out of them. It was the period of introspective psychology; i. e., of that psychology which takes its start from self-observation, and describes exactly the conscious processes which are discovered thereby, and analyzes them. The use of introspective psychology has enriched and deepened pedagogical knowledge. In Lotze's lectures on psychology and Brentano's "Psychology from the Empirical Standpoint" the teachers had splendid leaders. Lotze's lectures have had more stimulating and fruitful effect in Germany, Brentano's work in Austria. Especially were the higher educational circles of Austria influenced by the introspective line of psychology. Among the *Gymnasium* teachers of Germany the psychological current started much more slowly at first, and created much less of a stir. But since the introduction of seminars for the training of *Gymnasium* teachers the young German higher teachers<sup>2</sup> have been well trained in psychology.

It is a characteristic of introspective psychology that it divides into many lines of scientific inquiry. Just this multiplicity brings to the scholar the stimulation of rich material, but must make it hard for the school teachers to understand each other in

<sup>1</sup> The elementary teachers received at the normal schools (*Lehrer-Seminarien*) a general or encyclopaedic training, whereas the *Gymnasium* teachers got a training in a special field at the university.

<sup>2</sup> The young graduates who have passed their state examination must make themselves at home in the questions of practical pedagogy for two years, under the direction of a *Gymnasium* director, before they enter the service of the schools as regular teachers in full standing.

the practical applications to education. Instead of the firm but inflexible psychological traditions of the common schools, the higher schools often showed a weak and uncertain fluctuation with regard to psychological foundations. This fluctuation will continue as long as the *Gymnasium* teachers reach back to the standpoints of introspective psychology for all their psychological needs. In the multiplicity and counter-claims of the opinions which they find here, they lose only too easily all their bearings.

We have already remarked that in the meantime the psychology of the universities has progressed from the stage of the introspective method to a new one. It has advanced to the *experimental method*, and has taken psychological experiment and statistics into its service. According to the earlier method, the faculties of the mind could be characterized only by inner observation. But experimentation gave the means for a much sharper definition and analysis of the mental life; and thus the view of it became for the first time exact and complete. This *objective analysis* also enabled the psychologists to work together in a very different way from that permitted by the earlier subjective analysis. Then the investigation always stuck at introductory questions. Now the psychologists were able to go from result to result with a unified plan. New and fruitful discoveries kept on following each other in those fields of the mental life which are accessible to experimental treatment.

Out of this intense scientific activity a hand was reached out in an entirely unforeseen way to the schools. The self-sufficiency with which psychological investigators had once remained attached to their particular problems disappeared. The experimental method itself gave the impulse toward extending the circle of its investigations from the theoretical atmosphere of the university laboratories into the field of practical life. For this method presses on to seek out and lay hold of new opportunities which admit of the experimental and statistical study of consciousness; so it hit upon the school child. Here many of the conditions of exact observation are united in the most fortunate way; the large number of subjects, the average uniformity of psycho-physical status, the comparison of the psychological

results with the observations of the instructor. And so this experimental work is beginning to atone for the sin of neglect toward the schools which the earlier university psychology had on its conscience. What the teachers had sought so long, and until now so vainly, in scientific psychology, is now offered to them at the hand of this new department of psychological science: sure, objective matter of fact in psychology.

The investigations which struck into this new field began with the *measurements of fatigue among school children*. The experimental psychologists were incited to such measurements through the example of the physicians. The causes, the processes, and the results of mental fatigue (fatigue of attention) produced by school instruction were studied. Out of the, in part, alarming results which here came to light came inferences and demands with regard to what one might call the *framework* of instruction. Questions arose as to the arrangement of the place and time of instruction, the number of lessons and their time, sequence, and hygiene. The results of experimental investigation had given standards right at hand for what ought to take place if instruction were carried on rationally. Exact examination now began as to whether in these respects everything was ordered according to the demands of hygiene and economy of mental effort.

In this way experimental psychology found itself, hand in hand with the physicians, critically opposed to many of the traditional arrangements in the schools. The first close contact of scientific psychology with pedagogical practice was thus given. For the rest, the German public, ever since the measurements of fatigue, has been inclined to lay an altogether too exclusive stress on the necessity of school physicians. It would be at least as much to the purpose to instal school psychologists, trained in experimental methods. It would be their task, not only to control the psycho-physical energy of the students and the use of it, but also to undertake a whole series of other psychological investigations with the school children which would be not less weighty for education. For the investigations of experimental psychology among school children have not remained at a stand-



still with the phenomena of fatigue. Experimental psychologists have come to meet the needs of educational psychology in much deeper ways. They have also extended their researches to the mental peculiarities of the school child, his mode of learning, suggestibility, intelligence, power of memory, accuracy of perception, and so forth. Just as the results of the fatigue measurements had turned attention to the ordering of instruction and of lessons, and had given for these critical standards and warnings ready at hand, so this second series of experimental results brings critical and reforming (or at least noteworthy) points of view to bear on the curriculum. To work out a curriculum rationally we must propose three questions:

a) We must first know what content of consciousness we may assume in the children who are to receive the first instruction.

b) Second, we must be clear on the question of how far their capacity for mental work extends—what can be demanded of it, and what not.

c) Third, it is worth while to consider how their capacity for mental work advances with age, so that in connection with it the instruction also may be gradually deepened and organized with greater coherence.

In regard to all three questions the experimental psychology of the school child has brought rich material, which still calls for sifting and evaluation, from an educational standpoint, and for just this.

The curriculum is, as it were, the skeleton of instruction, just as the number, time, and sequence of lessons belong to its outer structure. The animating nerve of the whole organism (to carry out the figure) is the *teaching method*. “How shall I instruct? May I instruct thus and so?” are the questions which touch every teacher in the higher degree. To answer these, the teacher was until recently driven to the general or local school tradition or to his own experience; that is to say, to sources the scientific worth of which is very contestable. It was a natural step forward to imitate psychology, and utilize its statistical and experimental procedure, in order to decide the questions of

methods of instruction by objective norms, instead of by subjective arbitrariness and instinct. From such views arose an *experimental didactic*, in the narrower sense of the word. Experimental didactics is that educational discipline which makes use of experiment and statistics as tools for the criticism of methods. Experiment is here applied immediately to the educational procedure itself, instead of turning over to the teacher simply facts concerning the scholars or subject-matter, as the above-mentioned psychological investigations had done. He must retain or abandon his method of instruction according to the results of experimental and statistical testing, or in some cases correct and modify it by them.

We have just seen that experimental psychology drew the external arrangement of instruction, the curriculum, and the methods of teaching within the scope of its testing and investigation. It is hardly to be expected that it would remain silent on the question of the *possibility of education* and the *aim of instruction*. It has indeed placed the first problem in a new light. On the other hand, some may doubt whether experiment and statistics can be trusted to pronounce also on the aim of instruction. It is enough if they promise clearness concerning the means and presuppositions of education and instruction.

Nevertheless, it is evident that experimental occupation with the question of education and instruction is hardly thinkable without carrying with it certain convictions concerning what one might call the end and aim of teaching, or without having such convictions arise in the course of the investigations and the consideration of their results. The students of experimental pedagogy have a good right to express their convictions. These are at least worthy of more consideration than many phrases concerning the aim of instruction which still pass much too lightly from mouth to mouth and from pen to pen. Every discussion, even the discussion of this last and most difficult pedagogical question, can only gain and deepen when the serious convictions of serious men are expressed and tested by facts.

The author of the foregoing pages has repeatedly lectured before the students of the University of Halle concerning experi-

mental pedagogy. He has given expositions of similar character in the teachers' associations of the Prussian province of Saxony and its neighborhood. He hopes to be allowed to present to the American readers of the *School Review* in a series of articles a more exact picture of the new pedagogical tendencies in Germany than could be given in the above brief mention. He would like to tell in detail what experimental pedagogy accomplishes in relation to the questions of instruction and education, and what it does not accomplish. What it does *not* accomplish as well as what it does accomplish; for the picture must not bear the one-sided coloring of a blind partisan. And, further, he will aim not so much at a colorless report of the new movement as at a thorough critical evaluation.